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ABSTRACT

This study examined sex differences in faculty salaries, exploring how lower salaries for women varied across different rank/experience cohorts. Data came from the 1993 National Study of Postsecondary Faculty. Six cohorts were defined: assistant professors with 1-2 years experience, 3-6 years experience, 7-12 years experience, or 13-20 years experience, and full professors with 13-20 years or more than 20 years of experience. The dependent variable was basic salary. Independent variables included research productivity, measured by number of refereed publications in the past two years; service and administrative productivity, measured by percent of time allocated to each activity; and teaching productivity, measured by teaching level and committee work. Among younger faculty at each rank, lower salaries for women related to other differences between women and men faculty (lower levels of human capital investment and research productivity, and over-representation in particular types of institutions and fields). Among the older faculty at each rank, the observed male-female salary advantage was only partially explained by these differences. Women full-time faculty received basic salaries that were 25 percent lower than those of men in full-time faculty positions. Experience was an important predictor of basic salary. The influence of race/ethnicity on salary varied across the cohorts, although without a pattern. (Contains 54 references.) (SM)

**SEX DIFFERENCES IN FACULTY SALARIES:
A COHORT ANALYSIS**

by

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Abstract: This study draws upon human capital and structural approaches to academic labor markets to explore the extent to which the lower observed salaries for women than for men full-time faculty vary across different rank/experience cohorts. Data are from the 1993 National Study of Postsecondary Faculty. Descriptive and regression analyses are used to address the research questions.

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SEX DIFFERENCES IN FACULTY SALARIES:

A COHORT ANALYSIS

Annual salary increases for college and university faculty generally take the form of a percentage increase over base, rather than an actual dollar award. These percentage increases are typically determined without regard to the base dollar salary (Hansen, 1988). As a result, early advantages in salaries persist over time, even when the performance of lower paid faculty is superior (Hearn, 1999). As Hearn (1999) has noted, sex differences in starting salaries are particularly problematic because of this annuity feature of faculty salaries. Specifically, initial inequities in the salaries of women and men faculty are very difficult to resolve through the annual process of awarding merit or across-the-board salary increases.

Prior research has consistently shown that female faculty receive lower salaries than their male counterparts even after controlling for differences in such characteristics as education, experience, productivity, institutional characteristics, and academic discipline (Ferber & Green, 1982; Gregorio, Lewis, & Wannter, 1982; Persell, 1983; Barbezat, 1988; Konrad & Pfeffer, 1990; Weiler, 1990; Bellas, 1993; Broder, 1993; Langton & Pfeffer, 1994; Toutkoushian, 1998). Only a few researchers (e.g., Hirsch & Leppel, 1982; Formby, Gunther, & Sakano, 1993) have explored the extent to which sex differences in faculty salaries are attributable to differences in starting salaries, however. Moreover, the results of such research are inconclusive, with Hirsch and Leppel (1982) concluding based on their single institution study that differences in male and female earnings profiles are primarily due to differences in starting salaries, and Formby and colleagues (1993) concluding that the starting salaries of women and men faculty are comparable after controlling for characteristics of the employing department. This study seeks to improve our understanding of sex differences in faculty salaries by exploring the extent to which the observed lower salaries for women than for men vary across different rank/experience cohorts.

Theoretical framework

Two theoretical perspectives are appropriate for examining the sources of observed differences in faculty salaries: human capital and structural. Human capital theory focuses on the characteristics of

individual workers, while structural approaches emphasize the attributes of the organizations with which individuals are connected (Youn, 1988).

According to the economic theory of human capital and neoclassical approaches to the labor market, employment status is determined by an individual's productivity, the investments an individual has made in his or her productivity, and the supply of and demand for workers with similar levels and types of training and expertise. Differences in productivity are expected to be attributable to differences in the investments that individuals have made in their personal development, such as the quantity and quality of their education, the amount of their on-the-job training, their geographic mobility, and their emotional and physical health (Schultz, 1961; Becker, 1962). According to this perspective, disparities in the salaries of faculty within a particular academic discipline should be accounted for by variations in their productivity while salary differences among faculty across disciplines should be attributable to differences in the supply of and demand for faculty trained in each discipline.

Despite the popularity of human capital theory for explaining labor market experiences, some economists and sociologists have noted the theory's limitations (England, 1982; DeYoung, 1989; Dreijmanis, 1991). Critics have argued that, "focusing on the supply of human skills to explain economic inequality and lack of productivity is a theoretical mistake" (DeYoung, 1989, p. 155) and that, "human capital theory has not generated an explanation of occupational sex segregation that fits the evidence" (p. 358). Among the limitations of human capital theory is its failure to adequately explain the lower returns to educational investments for women and minorities (DeYoung, 1989).

Social scientists interested in issues of social inequality and poverty have responded to the inadequacies of human capital theory by developing structural or institutional approaches to labor markets (Youn, 1988). Structural approaches to academic labor markets focus on the influence of the characteristics of the colleges and universities in which faculty were trained and work, including financial resources, student enrollment, the tenure system, and collective bargaining agreements. According to such approaches, labor market inequalities are attributable to organizational attributes including the tendency of organizations to structure positions, sort employees, and institutionalize rewards (Youn,

1992). Youn (1992) identified three forms of segmentation in the academic labor market: segmentation by academic discipline, segmentation by institutionalized job task (e.g., primarily research, primarily teaching), and segmentation by job status (e.g., full-time or part-time). Movement across segments (e.g., from mathematics to English, from a two-year institution to a research university, from part-time to full-time) is restricted. As a result, competition among faculty in different segments is limited, permitting the persistence of inequities among faculty in different segments.

Therefore, structural models posit that sex differences in faculty salaries are attributable to the segregation of women in the types of institutions, academic fields, and work roles that have lower prestige and value (Smart, 1991). Some research supports this view. For example, Sorenson (1989) found that 20% of the national male-female wage difference in 1983 for all occupations, not just for faculty or higher education positions, was attributable to occupational segregation by sex after controlling for personal characteristics (e.g., tenure on the job, educational attainment, and full- or part-time status), characteristics of the occupation (e.g., education and training required to perform the job and working conditions), and attributes of the firm (e.g., geographic region, union status, size of firm, and major industry category). In higher education, the average salaries of faculty in institutions and disciplines with higher proportions of women have also been found to be lower than the average salaries of faculty in institutions and disciplines with smaller proportions of women (Barbezat, 1988; Smart, 1991; Bellas, 1994, 1997).

Research method

This study draws upon human capital and structural approaches to academic labor markets to explore the extent to which the lower observed salaries for women than for men full-time faculty vary across different rank/experience cohorts. Specifically, this study explores the following research questions:

1. How do the characteristics of women faculty compare with the characteristics of men faculty of the same academic rank and level of experience?
2. How do the basic salaries received by women faculty compare with the basic salaries received by

men faculty after taking into account differences in human capital investment, productivity, and structural characteristics?

3. How do sex differences in basic salaries vary with academic rank and level of experience? In particular, to what extent do sex differences in faculty salaries appear to be related to differences in starting salaries?

The 1993 National Study of Postsecondary Faculty (NSOPF:93) is used to address the research questions. Sponsored by the U.S. Department of Education's National Center for Education Statistics, the NSOPF:93 is a nationally representative sample of college and university faculty and instructional staff who were employed by public and private non-proprietary higher education institutions in fall 1992. The sample used in these analyses is limited to individuals with faculty status who were employed full-time with a regular appointment and some instructional duties, whose principal activity was teaching, research, or administration, and who had at least a nine-month appointment. To minimize the influence of large sample sizes and the non-simple random sample design on standard errors, each case is weighted by the NSOPF:93 weight divided by the average weight for the sample. The adjusted weighted sample used in these analyses numbers 13,359, representing 420,911 faculty nationwide.

The NSOPF:93 has several advantages for examining the research questions, not the least of which are the high response rate and large nationally representative sample. Nonetheless, like all secondary data analyses, the research is limited to some extent by the data. One limitation is that the NSOPF:93 is a cross-sectional rather than a longitudinal survey. As a result, the NSOPF:93 does not track the salary history for each participating faculty member. Moreover, the NSOPF:93 survey asks faculty to report only their current salary, not their starting salary. Therefore, this research explores sex differences among faculty of the same "cohort". Six cohorts are defined based on academic rank and the number of years spent working full-time in a teaching, research, or administrative position at a two-year or four-year college or university. Table 1 shows the distribution of full-time faculty in the subsample by rank and level of experience. The six cohorts that are the focus of the analyses are: assistant professors with one or two years of experience (18% of all assistant professors); assistant professors with three to six

years of experience (40% of all assistant professors); associate professors with seven to 12 years of experience (31% of all associate professors); associate professors with 13 to 20 years of experience (33% of all associate professors); full professors with 13 to 20 years of experience (30% of all full professors); and full professors with more than 20 years of experience (50% of all full professors). These six cohorts represent 55% of all full-time faculty with regular appointments and at least some instructional duties, whose principal activity is teaching, research, or administration, and who have at least a nine-month appointment.

Insert Table 1 about here

Both descriptive and regression analyses are used to address the research questions. At the descriptive level, analysis of variance and cross tabulations are used to compare the characteristics of women and men faculty in each of the six rank/experience cohorts. For the sample overall, and then for each rank/experience cohort separately, ordinary least squares regression analyses are used to isolate the effects of sex on faculty salaries holding constant all other variables in the model.

Variables

The NSOPF:93 contains several variables describing the compensation of college and university faculty, including basic salary from the institution, other income from the institution, outside consulting income, and total earnings. Considering total earnings from all sources is appropriate for examining the "financial welfare" of faculty (Bowen & Schuster, 1986) and for comparing the compensation of faculty with the compensation other professionals (Dillon & Marsh, 1981). Because this research focuses on the extent to which women and men faculty are compensated equally by their institutions for basic performance after accounting for differences that may be expected to be related to compensation, the most appropriate dependent variable is the basic salary received from the institution. Basic salary is expressed as a natural logarithm so that the unstandardized regression coefficients reflect the percentage change in salary associated with a one-unit change in each independent variable. About 3% of the cases ($n = 346$) are eliminated from the analyses because of "extreme" basic annual salaries, defined as less than \$12,000 or greater than \$175,000.

following dichotomous variables: married with dependents; married with no dependents; and not married with dependents. Being unmarried with no dependents is the reference category.

The primary measure of research productivity is the total number of refereed publications in the past two years, standardized by academic field and institutional type. Following the example of Fairweather (1993), the total number of refereed publications is the sum of the number of articles in refereed journals, books, book reviews, chapters in edited books, and monographs. The measure of refereed publications used in this study differs from that used by Fairweather (1993) in that it is standardized by academic field and institutional type. Because of this standardization, the number of refereed publications is measured relative to the average number of recent refereed publications for faculty who work in the same academic field and same Carnegie classification of college or university.

Some evidence suggests diminishing marginal returns to publishing (Tuckman & Hagemann, 1976; Tuckman & Tuckman, 1976; Tuckman, 1979), regardless of the type of institution in which faculty work (Fairweather, 1995). In other words, faculty salaries have been found to increase with each additional publication, but the increment in salary associated with each additional publication declines as the total number of publications increases. To control for a possible non-linear relationship between refereed publications and faculty salaries, the standardized number of refereed publications, squared is also included in the regression analyses.

Other measures of research productivity are whether the faculty member serves as a principal or co-principal investigator on at least one funded research project and the percent of time spent on research rather than teaching. The correlation between time spent on research and time spent on teaching is -0.58. Following the example of Fairweather (1993), factor analysis is used to construct a less redundant measure of the percent of time on research relative to teaching. The alpha reliability coefficient for this factor is 0.72.

Although several observers (e.g., Martin & Berry, 1969; Bowen & Schuster, 1986; Fox, 1985; Hansen, 1988; Glassick, Huber & Maeroff, 1997; Lewis, 1998) have concluded that faculty reward systems emphasize research over other activities, teaching, service, and administration may also play a

role. In this study, teaching productivity is measured by teaching level and committee work. Teaching level reflects whether an individual teaches graduate students only (yes or no) or both undergraduate and graduate students (yes or no). Teaching only undergraduates is the reference category. Because of the non-normal distribution, committee work is measured by whether an individual serves on one to four thesis or dissertation committees or five or more committees. Serving on no committees is the reference category.

Service and administrative productivity are measured by the percent of time allocated to each of these activities. Because of their non-normal distributions, both the percent of time spent on service and the percent of time spent on administration are treated as a series of dichotomous variables rather than as continuous variables. Chairing the department is an additional measure of administrative productivity.

Structural approaches to academic labor markets posit that structural characteristics influence labor market status by constraining employment experiences. The Carnegie classification of the institution at which faculty work is used to control for such structural characteristics as institutional resources, size, and mission. Institutional control (public or private) is an additional measure of institutional resources. A dichotomous variable reflecting unionization is also included since unionization has been shown to be associated with both higher wages and a smaller African American-White salary gap (Ashraf, 1994). A final structural attribute is whether the individual holds a tenure track position, a non-tenure track position, or a position at an institution without a tenure system rather than a tenured position.

Prior research has shown that faculty reward systems vary by academic discipline (e.g., Tuckman & Hagemann, 1976; Smart & McLaughlin, 1978; Tuckman, 1979; Marshall & Perrucci, 1982; Pfeffer & Langton, 1988) and that these differences can be understood in terms of Biglan's (1973) categorization of academic fields (Smart & McLaughlin, 1978). Therefore, using the dimensions identified by Biglan (1973) each academic field is categorized in terms of "hard" versus "soft," "pure" versus "applied," and whether concerned with life systems. To minimize the amount of missing data, a fourth variable, unknown academic field is also included. To control for the possible relationship between salaries and

the segregation of women in particular academic fields, the percentage of women faculty in each field was calculated. Because of the non-normal distribution of the variable, three dichotomous variables are included in the model: work in a field with the lowest quartile representation of women (e.g., engineering, political science), work in a field with the second quartile representation of women (e.g., mathematics, biological sciences), and work in a field with the third quartile representation of women (e.g., communications, fine arts). Working in an academic field with the highest quartile of representation of women is the reference category (e.g., education, nursing).

Geographic region is included as a proxy for regional variations in the supply of faculty of different racial/ethnic groups. Descriptive analyses (available from the author) reveal that the distribution of faculty across the United States varies by race/ethnicity, with African Americans relatively overrepresented in the Southeast, Hispanics relatively overrepresented in the Southwest and Far West, and Asian Americans relatively overrepresented in the Far West. Four regions are considered in these analyses: East, Midwest, West, and South. South is the reference category.

Five non-overlapping racial/ethnic/citizenship groups are considered in the analyses: White, African American, Hispanic, Asian American, and non-U.S. citizen. Considering non-U.S. citizens in a separate category is important because the proportion of faculty who are not citizens of the United States varies by racial/ethnic group, ranging from 4% of Whites and 7% of African Americans to 16% of Hispanics and 36% of Asians.

Findings

Characteristics of faculty of different cohorts

The descriptive analyses reveal that the representation of women among full-time faculty declines as rank and experience increase. Table 2 shows that about one-half (49%) of all assistant professors with one or two years of experience are women, compared with only about 30% of associate professors with seven to 20 years of experience, 20% of full professors with 13 to 20 years of experience, and just 12% of full professors with more than 20 years of experience.

America's college and university faculty are also somewhat more racially/ethnically diverse at the lower than the higher academic rank and experience levels. Moreover, the representation of faculty of color varies by sex. Table 2 shows that African Americans represent a higher share of women than men faculty among both assistant professors (7% versus 3%) and full professors with more than 20 years of experience (6% versus 2%). Hispanics represent about 2% of women and 3% of men new assistant professors, and only 1% of women and 1% of men full professors with more than 20 years of experience. Faculty who are not U.S. citizens represent a substantially higher share of male than female faculty among both new assistant professors (16% versus 5%) and assistant professors with three to six years of experience (22% versus 5%). Only 2% of men and 1% of women full professors with more than 20 years of experience are not U.S. citizens. Contrary to these trends, Asian American men appear to represent a slightly smaller share of assistant professors than of full professors with more than 20 years of experience (1% versus 3%).

Women generally have lower levels of human capital than men regardless of rank/experience cohort. For example, smaller proportions of women than men faculty hold doctoral degrees or held research assistantships during graduate school. Women also appear to be less geographically mobile than men, particularly at the associate and full professors ranks, as evidenced by the higher proportion of women than men in their first or only job since attaining their highest degree. Regardless of rank/experience cohort, substantially smaller proportions of women than men are married with children.

Research productivity is also observed to be lower for women than men of the same rank/experience cohort. Compared to men, women have fewer refereed publications in a recent two-year period after controlling for academic field and institutional type, spend less time on research relative to teaching, and are less likely to be the principal or co-principal investigator on at least one funded research project. Higher proportions of women than men teach only undergraduates, serve on no thesis or dissertation committees, and spend at least some time on service.

In terms of structural characteristics, women appear to be relatively underrepresented among faculty at research universities and relatively overrepresented among faculty at public two-year

institutions after controlling for rank and experience. Smaller proportions of women than men work in hard rather than soft academic fields, while higher proportions of women than men work in fields with a life systems orientation. Women appear to be rather segregated by academic field, with about 40% of all women working in the 25% of academic fields with the highest representation of women. The segregation of men by academic field appears to be somewhat greater among assistant professors with about 40% of male assistant professors, but only about one-third of male associate and full professors, working in the 25% of academic fields with the lowest representation of women.

The descriptive statistics also show that average salaries are higher for men than for women of the same rank/experience cohort. Among women, average basic salaries range from about \$36,000 for assistant professors, to about \$43,000 for associate professors, to about \$53,000 for full professors. Among men, average basic salaries range from about \$40,000 for new assistant professors, to about \$49,000 for associate professors, to about \$62,000 for full professors.

Insert Table 2 about here

Relationship between sex and faculty salaries

Overall, women full-time faculty are observed to receive basic salaries that are about 25% lower than the basic salaries received by men full-time faculty. Table 3 shows that the male-female salary differential is reduced to 11% when differences in human capital are taken into account. Controlling also for differences in productivity and structural characteristics further reduces the male-female salary gap to 7%. This finding is slightly smaller than the 8% to 10% sex difference found by Toutkoushian (1998), who used the same database (NSOPF-93) but focused more specifically on the effects of race and marital status on faculty salaries. The model used by Toutkoushian (1998) was more limited than the one used in this study, with no controls for differences in teaching, service, or administrative activities or segregation by academic field.

Insert Table 3 about here

Experience is clearly an important predictor of the basic salaries received by full-time faculty. Table 4 shows that, among full-time overall, basic salaries increase with experience but at a decreasing

rate. To further understand sex differences in basic salaries among faculty with similar academic ranks and levels of experience, separate regression analyses were conducted for each of the six rank/experience cohorts.

Insert Table 4 about here

Table 3 shows that both the smallest and the largest observed male-female differences in basic salaries are at the assistant professor level. Average salaries are observed to be 11% lower for women than for men among assistant professors with one to two years of experience, but 17% lower for women than for men among assistant professors with three to six years of experience. Among new assistant professors, associate professors with seven to 12 years of experience, and full professors with 13 to 20 years of experience, the male-female salary differential disappears when differences in human capital investment, productivity, and structural characteristics are taken into account. Differences in human capital investment, productivity, and structural characteristics explain some, but not all, of the observed male-female salary gap among assistant professors with three to six years of experience, associate professors with 13 to 20 years of experience, and full professors with more than 20 years of experience, however. Table 3 shows that, even after controlling for other variables, average salaries are 7% lower for women than for men assistant professors with three to six years of experience, 8% lower for women than for men associate professors with 13 to 20 years of experience, and 4% lower for women than for men full professors with more than 20 years of experience.

The relationship between race/ethnicity and basic salaries appears to vary across the six cohorts but does not appear to follow a pattern. Table 4 shows that basic salaries are 12% higher for African American new assistant professors than for their counterparts of other racial/ethnic groups after controlling for other variables. Among assistant professors with three to six years of experience, basic salaries are about 10% higher for Asian Americans than for other faculty, net of other differences. Hispanics appear to fare worse among associate professors with seven to 12 years of experience (with 16% lower salaries) and better among full professors with more than 20 years of experience (with 12% higher salaries) than their counterparts of other racial/ethnic groups.

A review of the change in R^2 statistics in Table 3 shows that human capital investment makes an important contribution to the percent of variance in faculty salaries that is explained for all six rank/experience cohorts. Regardless of rank/experience cohort, faculty who hold first-professional degrees (e.g., MBA, MD, JD) receive substantially higher salaries than faculty who have earned less than a doctorate. Holding the first or only job since receiving the highest degree, the best available measure of mobility, is associated with higher salaries for associate and full professors with 13 to 20 years of experience but lower salaries for full professors with more than 20 years of experience. Assistant professors who are married with children receive higher salaries than other assistant professors net of other differences.

Sex differences in productivity also appear to be an important source of the observed male-female salary gap, especially for assistant professors with three to six years of experience and full professors as shown by the change in the unstandardized regression coefficients for female when productivity variables are added to the model (Table 3). Among new assistant professors, but not among faculty of other rank/experience cohorts, basic salaries increase at a declining rate as the number of refereed publications in the past two years increases relative to the average number of publications for others in the same academic field and type of institution. Faculty who serve as the principal or co-principal investigator on at least one funded research project average higher salaries, except among associate professors with seven to 12 years of experience and full professors with 13 to 20 years of experience. Spending more time on research relative to teaching is associated with higher salaries, net of other differences, except among associate professors with 13 to 20 years of experience. Teaching only undergraduates is associated with lower salaries among assistant and full professors, while teaching only graduate students is associated with higher salaries among associate and full professors. After controlling for other variables, serving on five or more thesis or dissertation committees is associated with lower basic salaries among all cohorts except new assistant professors and associate professors with seven to 12 years of experience. Spending more than 10% of their time on administration is associated with higher salaries for all but new assistant professors.

Differences in structural characteristics are also an important source of the observed gap in salaries for men and women faculty. Working at a research or doctoral university is associated with higher salaries, net of other differences, among all cohorts except new assistant professors. Faculty who work in pure academic fields average lower salaries than their counterparts in applied academic fields regardless of rank/experience cohort. After controlling for human capital investment, productivity, and other structural characteristics, average salaries are higher faculty who work in fields with the smallest proportion of women in all six rank/experience cohorts.

Discussion

The analyses reveal an interesting pattern of sex differences in faculty salaries. Among the "younger" faculty at each of the three ranks, the lower observed salaries for women than for men appear to be entirely attributable to other differences between women and men faculty particularly their lower levels of human capital investment, their lower levels of research productivity, and their relative overrepresentation in particular types of institutions and academic fields. Among the "older" faculty at each rank, however, the observed male-female salary advantage is only partially explained by these differences. In other words, among "older" faculty at each rank, women receive lower salaries than men only in part because they possess fewer of the attributes and characteristics that are associated with higher salaries. The unexplained salary differentials range from 4% among full professors with more than 20 years of experience, to 7% among assistant professors with three to six years of experience, to 8% among associate professors with 13 to 20 years of experience. This pattern of sex differences suggests that promotion to a higher rank is associated with an "equalization" of salaries between women and men, but that sex differences creep into the salary determination process in the years following the more institutionalized processes of hiring and promotion.

Although salaries appear to be comparable for women and men new assistant professors after taking into account other differences, the presence of lower salaries for women than for men among the "older" faculty at each of the three ranks (even with periodic "corrections") is problematic, given the annuity feature of faculty salaries. Every year of inequity contributes to a lower total accumulation over

the course of the career of such indicators of financial security as savings, contributions to pension funds, interest accumulations to pension funds, institutional matching contributions to pension funds, and retirement benefits.

There are at least two possible explanations for the finding that women in these three cohorts receive lower salaries than men even after controlling for other variables. One possibility is that the lower salaries for women than for men reflect differences between women and men in variables that are related to salaries but are omitted from the model. The percentage of variance in salaries that is not explained by the model ranges from about 68% for associate professors with 13 to 20 years of experience to 44% for assistant professors with three to six years of experience, providing some support for this conclusion.

Women in these three cohorts may also receive lower salaries than men because of the use of practices that are unrelated to merit, achievement, or supply and demand. For instance, part of the unexplained gap in the salaries of women and men faculty may be attributable to the greater tendency of men than women to solicit employment offers from another college or university, a practice that has been shown to be associated with higher faculty salaries at one research university (Kasten, 1984). West (1995) argued that women may be disadvantaged by this practice if they are less geographically mobile than men or if they are less comfortable than men with this type of behavior. Women may also receive lower salaries than men because they are less skilled at, or less comfortable with, negotiating (Tierney & Bensimon, 1996).

In addition to the possibility of non-merit related practices, the analyses suggest several other ways in which the salary determination process favors men over women regardless of academic rank or level of experience. One source of male advantage pertains to the relationship between productivity and faculty salaries. The salary premiums associated with research activities are greater than the premiums in salary that are associated with other types of activities. After controlling for other variables, faculty who spend more time on research relative to teaching and who are the principal or co-principal investigator on at least one funded research project receive higher basic salaries than other faculty. But, regardless of

rank or experience, women spend less time on research relative to teaching and are less likely to be principal or co-principal investigators.

These findings suggest that colleges and universities should review their policies and practices for determining faculty salaries to not only ensure that such practices are not discriminatory, but also to ensure that these practices recognize the range of research, teaching, service, and administrative activities in which women faculty tend to engage and that these practices provide incentives for faculty to accomplish institutional goals and priorities (Tierney & Bensimon, 1996). A reward system that emphasizes research fails to recognize the reality that many women may be required to, and may prefer to, allocate greater time than White men to non-research activities (Tierney & Rhoads, 1993; Park, 1996). Voluntarily or involuntarily, women generally have heavier teaching loads, serve on a greater number of institutional committees, and spend more of their time advising students (Menges & Exum, 1983; Park, 1996; Tierney & Bensimon, 1996; Finkelstein, Seal & Schuster, 1998). Therefore, individual colleges and universities are strongly encouraged to critically compare the types of behaviors and activities that they are rewarding with the behavior and activities that they should be rewarding, particularly in the context of the stated mission (Stewart, Dalton, Dino & Wilkinson, 1996).

Colleges and universities must also ensure that faculty responsibilities, expectations, and reward criteria are clearly and consistently communicated to all faculty (Tierney & Rhoads, 1993; Tierney & Bensimon, 1996). Special attention must be paid to defining the criteria for evaluating faculty with joint or split appointments, a large proportion of whom are women, because faculty with joint appointments are required to manage competing demands and expectations (Menges & Exum, 1983; Tierney & Bensimon, 1996). The absence of clearly defined reward criteria and expectations may be especially detrimental to women if they are less likely than men to be integrated into their departments and institutions and have less access to professional networks and information (Johnstrud, 1993). Ambiguous reward criteria leave room for both deliberate and unintentional bias (Menges & Exum, 1983; Fox, 1985).

If, after reviewing faculty reward criteria, an institution concludes that research performance is an appropriate criterion to emphasize, then individual colleges and universities must ensure that all faculty

have equal access to the experiences and opportunities that have been shown to promote research productivity. Particular faculty experiences and responsibilities that should be examined include time available for research, magnitude of the teaching load, teaching level, availability of support for securing funded research projects, advising and service responsibilities, and availability of support to facilitate completion of the doctoral degree. External barriers to research productivity, including a lack of graduate assistants and inadequate work space, must be eliminated and effective research behaviors must be acquired so that time spent on research more readily translates into valued research products. As Bellas and Toutkoushian (1999) noted, ensuring that teaching and service responsibilities are equitably distributed requires attention to the number of courses taught, the number of new courses and course preparations, the frequency of course meetings, the number of students, graduate student support, the rate of change in course content, the intensity of evaluation methods, and the demands of committee work.

A second way in which the salary determination process appears to favor men over women pertains to the premiums associated with working at different types of institutions and academic fields. The regression analyses reveal that, except among new assistant professors, faculty at research and doctoral universities receive higher salaries than faculty at other types of institutions holding constant other variables. The descriptive analyses show, however, that women are relatively underrepresented among faculty employed at research universities and relatively overrepresented among faculty employed at public two-year institutions. Similarly, while the regression analyses reveal that salaries are higher, on average, for faculty who work in fields with the smallest proportions of women, the descriptive analyses show that only between 9% and 16% of women (depending on cohort) work in these fields. These findings support the conclusion of others (e.g., Smart, 1991) that women continue to be concentrated in the types of work roles (e.g., non-research), institutions, and academic fields that have lower prestige and value.

The descriptive analyses suggest that substantial progress has been made in increasing the representation of women among full-time faculty overall. About one-half of new full-time assistant professors are women, compared with only 12% of full-time full professors with more than 20 years of

experience. Because these data are from a cross-sectional rather than a longitudinal database, however, the extent to which the greater representation of women at the lower ranks is due to greater success in recruiting women faculty rather than slower rates of promotion to the higher ranks for women than for men is unclear. Substantially less progress has been made to correct the severe underrepresentation of African Americans and Hispanics among full-time faculty. Regardless, these analyses suggest that, in order to close the observed sex gap in faculty salaries, greater effort is required to increase the number of women faculty who are employed at the nation's most prestigious institutions and most "valued" academic fields. While certainly research universities should be able to take action to increase the representation of women at their institutions, efforts to increase the representation of women in the most "valued" academic fields will likely need to begin much earlier in the educational pipeline.

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Table 1. Distribution of full-time faculty by rank and number of years experience

Rank		Total	1 - 2 years	3 - 6 years	7 - 12 years	13 - 20 years	More than 20 years
Total	Row %	100.0	9.6	19.7	20.8	24.2	25.7
	Adjusted weighted n	13,205	1,273	2,595	2,745	3,199	3,393
Full professor	Row %	100.0	3.3	6.4	10.4	29.7	50.3
	Adjusted weighted n	4,390	144	279	456	1,304	2,207
Associate professor	Row %	100.0	4.2	11.7	30.6	33.3	20.2
	Adjusted weighted n	3,271	137	384	1,002	1,088	660
Assistant professor	Row %	100.0	18.2	40.3	24.6	10.7	6.3
	Adjusted weighted n	2,956	538	1,190	727	316	185
Instructor	Row %	100.0	18.2	32.6	22.2	16.6	10.4
	Adjusted weighted n	1,703	310	556	378	282	177
Lecturer	Row %	100.0	25.0	22.8	22.0	22.4	7.8
	Adjusted weighted n	232	58	53	51	52	18
Other rank	Row %	100.0	20.7	27.0	25.3	18.1	8.9
	Adjusted weighted n	237	49	64	60	43	21
No rank	Row %	100.0	8.9	16.6	17.1	27.4	30.0
	Adjusted weighted n	416	37	69	71	114	125

Note: Experience is defined as years spent working full-time in a teaching, research, or administrative position at a two-year or four-year college or university.

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF:93)

Table 2. Characteristics of men and women full-time faculty by rank and experience cohort

Characteristic	Assistant 1 - 2 years		Assistant 3 - 6 years		Associate 7 - 12 years		Associate 13 - 20 years		Full professor 13 - 20 years		Full professor More than 20	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Adjusted weighted sample size	275	263	714	476	702	300	750	338	1,047	257	1,945	262
Sex distribution within cohort	51.1%	48.9%	60.0%	40.0%	70.1%	29.9%	68.9%	31.1%	80.3%	19.7%	88.1%	11.9%
Basic salary - mean	39,723	35,768	43,743	36,029	48,687	43,311	49,120	42,615	60,516	52,189	62,095	53,981
Natural logarithm	10.5	10.4	10.6	10.5	10.7	10.6	10.8	10.6	10.9	10.8	11.0	10.9
Race/ethnicity/citizenship												
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
White	77.0	82.3	71.4	82.0	81.9	87.0	85.2	83.1	86.3	88.7	91.0	91.2
African American	2.6	6.8	3.2	7.1	3.3	6.0	4.3	8.0	3.3	5.8	2.0	5.7
Hispanic	3.3	2.3	2.2	2.3	1.7	1.7	1.1	1.5	2.0	2.3	1.3	0.8
Asian American	1.5	2.6	1.3	2.9	3.8	1.0	2.3	3.6	4.8	1.9	3.4	1.1
Non-US citizen	15.7	5.3	21.8	5.2	8.7	4.0	7.2	3.6	3.5	1.2	2.1	0.8
Highest degree												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Doctoral degree	61.3	53.6	70.5	60.2	73.7	66.2	69.2	61.5	76.6	62.6	78.6	72.2
Professional degree	19.0	11.0	11.6	8.4	14.1	7.4	13.9	5.9	13.9	13.6	8.4	3.8
Other	19.7	35.4	17.9	31.4	12.2	26.4	16.9	32.6	9.5	23.8	13.0	24.0
Teaching assistantship	57.8	54.0	61.9	54.2	57.7	55.0	57.1	45.6	56.9	41.2	54.5	41.2
Research assistantship	42.9	31.6	48.3	34.2	41.3	33.3	36.3	21.9	39.1	24.9	32.4	22.4
First/only job	23.4	28.5	26.6	25.7	19.0	26.1	29.5	34.1	36.1	41.2	45.7	56.9
Marital/parental status												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Married with dependents	59.3	42.2	64.2	40.5	71.8	47.2	75.7	39.3	75.9	36.6	71.2	27.9
Married, no dependents	11.6	13.7	13.0	20.0	10.8	17.7	6.9	21.9	10.7	28.4	15.0	27.5
Not married, with dependents	9.8	12.2	4.9	10.1	6.6	10.0	6.8	11.5	7.3	11.7	4.8	12.6
Not married, no dependents	19.3	31.9	17.9	29.4	10.8	25.1	10.5	27.2	6.1	23.3	9.0	32.1

Table 2. Characteristics of men and women full-time faculty by rank and experience cohort (continued)

Characteristic	Assistant 1 - 2 years		Assistant 3 - 6 years		Associate 7 - 12 years		Associate 13 - 20 years		Full professor 13 - 20 years		Full professor More than 20	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Refereed publications (stdized)	0.649	0.514	0.741	0.577	0.766	0.669	0.645	0.599	0.774	0.616	0.651	0.566
Research/teaching tradeoff	0.126	-0.167	0.450	-0.047	0.417	0.055	0.099	-0.092	0.316	-0.050	0.192	-0.145
Principal investigator	28.4	14.4	40.1	27.9	41.2	23.7	30.4	25.7	35.2	20.6	29.1	17.6
Department chair	5.5	5.7	7.7	9.9	16.6	16.0	15.2	12.5	20.6	22.6	17.7	19.5
Teaching level												
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Undergraduate	64.4	67.6	57.2	71.6	54.6	62.3	62.4	65.1	55.6	66.1	62.9	75.0
Both	23.6	11.3	24.9	13.5	21.0	15.8	17.8	19.4	21.0	14.7	18.1	15.7
Graduate	12.0	21.0	17.9	14.9	24.4	22.0	19.9	15.5	23.5	19.2	19.0	9.3
Thesis/dissertation committees												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No committees	59.5	66.3	45.1	55.7	40.8	49.6	49.4	53.8	41.8	53.0	39.3	58.1
1 - 4 committees	26.3	22.3	29.3	25.6	26.9	22.7	18.1	23.4	27.7	21.0	28.2	17.9
5 or more committees	14.2	11.4	25.6	18.7	32.3	27.7	32.8	22.8	30.5	26.0	32.5	24.0
Time on service												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No time	51.6	37.3	43.8	37.9	42.2	37.3	46.0	33.1	40.4	35.0	47.7	42.2
1% to 5%	24.4	34.2	29.5	32.3	28.9	30.7	26.0	34.3	30.5	33.9	26.8	33.1
6% to 10%	10.5	12.5	13.3	16.1	16.8	15.0	15.5	17.2	14.5	19.1	13.5	14.1
More than 10%	13.5	16.0	13.5	13.6	12.1	17.0	12.5	15.4	14.6	12.1	11.9	10.6
Time on administration												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No time	38.0	52.9	40.8	37.2	28.5	37.7	34.1	39.1	31.3	36.0	39.3	48.3
1% to 5%	25.2	16.3	19.9	21.6	19.1	14.0	16.3	14.2	16.1	12.0	17.3	11.0
6% to 20%	26.3	19.0	28.4	27.3	32.3	28.0	32.7	29.3	29.3	26.4	24.5	19.4
More than 20%	10.6	11.8	10.9	13.9	20.1	20.3	16.9	17.5	23.3	25.6	18.8	21.3

Table 2. Characteristics of men and women full-time faculty by rank and experience cohort (continued)

Characteristic	Assistant 1 - 2 years		Assistant 3 - 6 years		Associate 7 - 12 years		Associate 13 - 20 years		Full professor 13 - 20 years		Full professor More than 20	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Institutional type												
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Research university	30.4	27.8	40.0	29.1	40.7	24.7	38.7	26.0	36.6	25.3	40.6	21.0
Doctoral university	22.3	14.8	19.0	18.0	14.1	15.1	16.6	14.8	18.0	12.1	13.6	7.6
Comprehensive	24.5	31.6	22.7	25.6	23.8	24.7	23.4	25.7	23.2	26.8	23.9	32.4
Private liberal arts	7.3	8.7	7.1	11.5	7.3	11.7	7.1	9.8	6.4	8.2	7.4	9.2
Public two-year	7.0	11.4	5.3	10.1	6.4	15.4	9.6	16.6	8.3	24.1	10.2	26.3
Other	8.4	5.7	5.9	5.7	7.8	8.4	4.5	7.1	7.5	3.5	4.4	3.4
Tenure status												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Tenured	4.0	2.7	4.3	5.9	78.1	78.4	83.4	82.0	90.5	92.2	96.5	91.2
Tenure track	82.5	74.1	82.2	76.9	13.2	12.3	6.5	7.1	3.4	1.2	1.2	2.3
Not tenure track	8.0	14.8	8.3	10.1	3.3	2.0	3.5	3.8	1.1	0.4	0.5	0.4
No tenure system	5.5	8.4	5.2	7.1	5.4	7.3	6.7	7.1	4.9	6.2	1.9	6.1
Academic field												
Hard not soft	30.3	8.3	34.2	16.4	33.0	16.3	31.2	12.7	33.2	17.5	35.8	19.1
Pure not applied	33.1	33.3	38.5	39.2	33.7	43.0	39.3	36.7	44.7	42.8	55.2	50.8
Life systems orientation	34.7	49.8	37.1	47.0	36.0	53.2	41.4	50.6	35.7	49.8	35.3	48.5
Percent women in field												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Lowest quartile	44.2	13.7	39.4	16.1	33.3	13.0	30.7	9.2	34.6	11.3	32.6	12.2
2nd quartile	22.3	19.4	29.4	22.4	33.2	26.3	31.6	27.0	33.0	24.9	34.1	27.5
3rd quartile	20.1	24.7	18.6	24.7	21.1	17.7	19.1	17.5	19.8	23.3	17.0	15.6
Highest quartile	13.5	42.2	12.6	36.7	12.4	43.0	18.7	46.3	12.6	40.5	16.3	44.7

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF/93)

Table 3. Male-female differential in basic salaries associated with adding blocks of variables to the model for faculty of different rank and experience cohorts (unstandardized regression coefficients)

Variables controlled	Total	Assistant 1 - 2 years	Assistant 3 - 6 years	Associate 7 - 12 years	Associate 13 - 20 years	Full professor 13 - 20 years	Full professor More than 20
Unstandardized regression coefficients							
Sex	-0.252***	-0.112***	-0.169***	-0.116***	-0.129***	-0.138***	-0.131***
+ Race/ethnicity & citizenship	-0.250***	-0.113***	-0.163***	-0.113***	-0.125***	-0.132***	-0.126***
+ Human capital investment	-0.108***	-0.077**	-0.126***	-0.058**	-0.074***	-0.082**	-0.072***
+ Productivity	-0.091**	-0.069*	-0.094***	-0.051*	-0.086***	-0.051*	-0.048**
+ Structural characteristics	-0.072**	-0.029	-0.068***	-0.029	-0.079***	-0.034	-0.038*
Change in R²							
Sex	0.097***	0.031***	0.070***	0.029***	0.041***	0.024***	0.018***
+ Race/ethnicity & citizenship	0.005***	0.019	0.014**	0.004	0.010*	0.008	0.003
+ Human capital investment	0.258***	0.171**	0.200***	0.144***	0.104***	0.097***	0.138***
+ Productivity	0.099***	0.115***	0.135***	0.140***	0.101***	0.169***	0.163***
+ Structural characteristics	0.067***	0.114***	0.139***	0.125***	0.096***	0.120***	0.084***

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF-93)

Table 4. Predictors of basic salaries among full-time faculty of different rank and experience cohorts (unstandardized regression coefficients)

Independent variables	Total	Assistant 1 - 2 years	Assistant 3 - 6 years	Associate 7 - 12 years	Associate 13 - 20 years	Full professor 13 - 20 years	Full professor More than 20
Female	-0.072***	-0.029	-0.068***	-0.023	-0.079***	-0.034	-0.038*
African American	0.027*	0.121*	0.026	-0.011	0.042	-0.042	0.011
Hispanic American	-0.037*	-0.034	-0.045	-0.160**	0.022	-0.020	0.119*
Asian American	0.027	0.128	0.100*	-0.021	0.068	-0.049	0.005
American Indian	-0.051	0.100	-0.206	-0.115	-0.158	-0.103	0.025
Non-US citizen	-0.017	-0.037	0.019	-0.061	0.043	0.073	-0.025
Doctoral degree	0.127***	0.108**	0.015	0.098**	0.040	0.014	0.112***
Professional degree	0.243***	0.252***	0.222***	0.188***	0.156***	0.117**	0.205***
Teaching assistantship	0.000	-0.026	-0.012	-0.023	0.018	0.015	0.027*
Research assistantship	0.001	-0.045	-0.006	0.009	0.008	-0.003	0.014
Experience	0.121***						
Experience, squared	-0.018***						
First/only job	0.006	0.035	0.029	-0.004	0.051**	0.049**	-0.047***
Married with dependents	0.031***	0.067*	0.061***	0.031	0.025	0.025	0.012
Married, no dependents	0.011	0.063	0.004	0.055	0.006	0.008	0.000
Not married, dependents	0.026**	0.099*	0.048	0.095**	0.034	-0.007	-0.008
Refereed publications (standardized)	0.030*	0.197*	-0.011	-0.006	-0.013	-0.015	-0.021
Refereed publications, squared	0.013	-0.132*	0.042	0.030	0.021	0.034	0.049*
PI or co-PI for any grants	0.071***	0.112**	0.036*	0.013	0.082***	0.016	0.054***
Research/teaching tradeoff	0.043***	0.042*	0.027**	0.050***	0.013	0.063***	0.051***
Teach only grad students	0.073***	-0.015	0.025	0.066**	0.096***	0.113***	0.040*
Teach only undergraduates	-0.041***	-0.069*	-0.087***	0.021	-0.009	-0.050*	-0.045**
Serve on 1-4 committees	0.004	0.019	-0.011	-0.012	0.000	-0.010	-0.034*
Serve on 5+ committees	-0.012	-0.070	-0.055**	-0.006	-0.049*	-0.061**	-0.033*
1% to 10% of time on service	-0.012*	-0.028	0.003	-0.047**	-0.029	-0.018	0.014
More than 10% time service	0.005	0.042	0.036	0.022	-0.034	-0.050*	0.042*
1% to 10% time administration	0.014**	-0.021	-0.014	0.010	0.014	0.011	0.036**

Table 4. Predictors of basic salaries among full-time faculty of different rank and experience cohorts (unstandardized regression coefficients)
(continued)

Independent variables	Total	Assistant 1 - 2 years	Assistant 3 - 6 years	Associate 7 - 12 years	Associate 13 - 20 years	Full professor 11 - 20 years	Full professor More than 20
More than 10% time admin.	0.090***	-0.066	0.102***	0.077**	0.087**	0.077**	0.056**
Department chair	0.023**	0.032	0.016	-0.005	-0.011	-0.011	0.018
Research university	0.122***	0.011	0.177***	0.168***	0.150**	0.216***	0.212***
Doctoral university	0.100***	0.037	0.177***	0.184***	0.090*	0.164***	0.113**
Comprehensive college	0.023	0.005	0.056	0.025	0.023	0.039	0.051
Private liberal arts	-0.050***	-0.050	-0.011	0.027	-0.069	-0.048	0.020
Public two-year	0.076***	0.028	0.018	0.022	0.039	0.080	0.079*
Public	-0.031***	-0.037	-0.061**	0.032	-0.051*	-0.050*	0.008
Unionized	0.014**	-0.019	-0.009	-0.003	0.040*	0.027	0.013
Tenure track	-0.097***	0.014	-0.129***	-0.015	-0.034	-0.020	-0.055
Not tenure track	-0.157***	0.056	-0.161***	0.171**	0.017	0.037	-0.063
No tenure system	-0.130***	0.056	-0.146***	-0.031	-0.108**	-0.213***	-0.025
Hard field	-0.016*	-0.047	-0.034	-0.026	-0.031	0.005	-0.009
Pure field	-0.095***	-0.186***	-0.139***	-0.134***	-0.093***	-0.084***	-0.076***
Life systems field	0.013*	-0.016	0.029	0.055**	0.033	0.027	-0.002
Unknown field	-0.047***	-0.099	-0.076*	-0.013	0.028	-0.055	-0.072*
Lowest quartile women in field	0.084***	0.224***	0.119***	0.144***	0.072**	0.076**	0.065***
2nd quartile women in field	0.053***	0.181***	0.122***	0.113***	0.089***	0.019	0.039*
3rd quartile women in field	-0.011	0.062	-0.011	0.004	-0.090**	-0.019	0.018
East	0.090***	-0.004	0.112***	0.094***	0.065**	0.087***	0.131***
Midwest	0.009	-0.005	-0.012	-0.005	0.031	0.021	0.018
West & US service schools	0.106***	0.011	0.127***	0.082**	0.089**	0.168***	0.106***
Cases in the analyses	12,481	302	1,160	969	1,054	1,266	2,151
R ²	.527	.450	.558	.442	.352	.419	.606
Adjusted R ²	.525	.393	.539	.413	.322	.396	.593

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF '93)